CLAIMS

What is claimed is:

1. An apparatus transmitting a video signal and graphics data to a target device, comprising:

a controller generating a display control signal prescribing a manner in which said video signal is to be displayed in relation to said graphics data in a combined display and transmitting said display control signal to said target device, said combined display to be formed by combining said video signal and said graphics data at said target device based on said display control signal.

2. The apparatus transmitting said video signal and said graphics data as recited in claim 1, wherein:

said controller receives from said target device information comprising at least one of display capabilities and display features of said target device.

3. The apparatus transmitting said video signal and said graphics data as recited in claim 2, wherein:

said controller queries said target device for said information.

4. The apparatus transmitting said video signal and said graphics data as recited in claim 2, further comprising:

a storage unit storing said information comprising said at least one of display capabilities and display features received from said target device.

5. The apparatus transmitting said video signal and said graphics data as recited in claim 4, wherein said controller automatically updates said information in said storage unit when the at least one of display capabilities and display features of said target device changes.

6. The apparatus transmitting said video signal and said graphics data as recited in claim 4, wherein said controller updates said information in said storage unit upon receipt of a prompt by said target device when one of the display capabilities and the display features of said target device changes.

7. The apparatus transmitting said video signal and said graphics data as recited in claim 2, wherein:

said controller generates said display control signal based on said information received from said target device.

8. The apparatus transmitting said video signal and said graphics data as recited in claim 7, wherein said display control signal comprises:

a command instructing said target device to utilize said at least one of display capabilities and display features available at said target device in said prescribed manner.

9. The apparatus transmitting said video signal and said graphics data as recited in claim 8, wherein said command comprises:

a vendor dependent command from an Audio Visual Control Transaction Set (AV/C CTS).

10. The apparatus transmitting said video signal and said graphics data as recited in claim 8, wherein said at least one of display capabilities and display features comprises:

a picture-in-graphics (PIG) feature, said command further comprising information with respect to a starting position and a size of a video portion of said combined display.

11. The apparatus transmitting said video signal and said graphics data as recited in claim 8, wherein said at least one of display capabilities and display features comprises:

a double screen feature dividing a display unit of said target into sub-screens, said command further comprising information indicating in which of said sub-screens a video portion of said combined display is to be displayed.

12. The apparatus transmitting said video signal and said graphics data as recited in claim 8, wherein said at least one of display capabilities and display features comprises:

a chroma keying feature, said command further comprising information with respect to a color of said video signal to be replaced by said graphics data.

13. The apparatus transmitting said video signal and said graphics data as recited in claim 8, wherein said at least one of display capabilities and display features comprises:

a color keying feature, said command further comprising information with respect to a color of said graphics data to be replaced by said video signal.

14. The apparatus transmitting said video signal and said graphics data as recited in claim 1, wherein:

said video signal, said graphics data, and said display control signal are sent to said target device via an IEEE1394 serial interface.

15. The apparatus transmitting said video signal and said graphics data as recited in claim 14, wherein:

said video signal, said graphics data, and said display control signal each are sent as a packet of data.

16. The apparatus transmitting said video signal and said graphics data as recited in claim 14, wherein:

said display control signal comprises a packet of data separate and distinct from said packet of data of said video signal and said graphics data.

17. The apparatus transmitting said video signal and said graphics data as recited in claim 1, wherein:

said apparatus further comprises a set-top-box and said target device comprises a digital television set.

18. The apparatus transmitting said video signal and said graphics data as recited in claim 17, wherein:

said video signal comprises an MPEG-2 transport stream.

19. An apparatus displaying a video signal and graphics data received from a source, comprising:

a mixer combining said video signal and said graphics data to form a combined display; and

a processing unit receiving a display control signal from said source, to control said mixer by prescribing a manner in which said video signal is to be displayed in relation to said graphics data in said combined display.

20. The apparatus displaying said video signal and said graphics data as recited in claim 19, wherein:

said processing unit sends information with respect to at least one of display capabilities and display features of said target device to said source.

21. The apparatus displaying said video signal and said graphics data as recited in claim 20, wherein:

said processing unit sends said information upon receipt of a request from said source.

22. The apparatus displaying said video signal and said graphics data as recited in claim 20, wherein said information comprises:

an indication of available display features of said apparatus comprising at least one of a picture-in-graphics feature, a double screen feature, a chroma keying feature, and a color keying feature.

23. The apparatus displaying said video signal and said graphics data as recited in claim 22, wherein:

said information indicates whether said picture-in-graphics feature is supported by said apparatus, said information further comprising display capabilities of said apparatus comprising screen size, resolution, and allowable locations of a screen in which said video signal is to be displayed when said picture-in-graphics feature is supported by said apparatus.

24. The apparatus displaying said video signal and said graphics data as recited in claim 22, further comprising a display screen displaying said combined display.

25. The apparatus displaying said video signal and said graphics data as recited in claim 24, wherein:

said information indicates whether said double screen feature of dividing said display screen into sub-screens is supported by said apparatus, said information further comprising a field of available sub-screens in which said video signal is to be displayed when said double screen feature is supported by said apparatus.

26. The apparatus displaying said video signal and said graphics data as recited in claim 22, wherein:

said information indicates whether said chroma keying feature is supported by said apparatus, said information further comprising a field of allowable syntax by which an applicable color is described when said chroma keying feature is supported by said apparatus.

27. The apparatus displaying said video signal and said graphics data as recited in claim 22, wherein:

said information indicates whether said color keying feature is supported by said apparatus, said information further comprising a field of allowable syntax by which an applicable color is described when said color keying feature is supported by said apparatus.

28. The apparatus displaying said video signal and said graphics data as recited in claim 19, wherein:

said mixer receives said video signal, said graphics data, and said display control signal from said source via an IEEE1394 serial interface.

29. The apparatus displaying said video signal and said graphics data as recited in claim 28, wherein:

said apparatus comprises a digital television set and said source comprises a set-top-box.

30. The apparatus displaying said video signal and said graphics data as recited in claim 29, wherein:

said video signal comprises an MPEG-2 transport stream.

31. The apparatus displaying said video signal and said graphics data as recited in claim 30, further comprising:

a video decoder coupled to said mixer and said controller, said video decoder receiving and decoding said MPEG-2 transport stream, and outputting a decoded video signal indicative thereof to said mixer.

32. The apparatus displaying said video signal and said graphics data as recited in claim 31, further comprising:

a graphics processor coupled to said mixer and said controller, said graphics processor receiving and processing said graphics data, and outputting a processed graphics data indicative thereof to said mixer.

33. A system displaying a video signal and graphics data, comprising:

a source of said video signal and said graphics data, said source transmitting a display control signal prescribing a manner in which said video signal is to be displayed in relation to said graphics data; and

a target receiving said video signal, said graphics signal, and said display control signal, and combining said video signal and said graphics data in said manner prescribed by said display control signal to form a combined display at said target.

34. The system displaying said video signal and said graphics data as recited in claim 33, wherein:

said source receives from said target information comprising at least one of display capabilities and display features of said target.

35. The system displaying said video signal and said graphics data as recited in claim 34, wherein:

said target further provides said information based upon a query by said source.

36. The system displaying said video signal and said graphics data as recited in claim 34, wherein said information comprises:

available display features of said target comprising at least one of a picture-in-graphics feature, a double screen feature, a chroma keying feature, and a color keying feature.

37. The system displaying said video signal and said graphics data as recited in claim 36, wherein said information

indicates whether said picture-in-graphics feature is supported by said target, said information further comprising display capabilities of said target comprising screen size, resolution, and allowable locations of a screen in which said video signal is to be displayed when said picture-in-graphics feature is supported by said target.

38. The system displaying said video signal and said graphics data as recited in claim 36, wherein:

said target further comprises a display screen displaying said combined display.

39. The system displaying said video signal and said graphics data as recited in claim 38, wherein:

said information indicates whether said double screen feature of dividing said display screen into sub-screens is supported by said target, said information further comprising a field of available sub-screens in which said video signal is to be displayed when said double screen feature is supported by said target.

40. The system displaying said video signal and said graphics data as recited in claim 36, wherein:

said information indicates whether said chroma keying feature is supported by said target, said information further comprising a field of allowable syntax by which an applicable color is described when said chroma keying feature is supported by said target.

41. The system displaying said video signal and said graphics data as recited in claim 36, wherein:

said information indicates whether said color keying feature is supported by said target, said information further comprising a field of allowable syntax by which an applicable color is described when said color keying feature is supported by said target.

42. The system displaying said video signal and said graphics data as recited in claim 33, wherein:

said source comprises a set-top-box digital television and said target comprises a digital television set, wherein said set-top-box and said digital television set communicate with each other via an IEEE1394 serial interface.

43. The system displaying said video signal and said graphics data as recited in claim 42, wherein:

said video signal comprises an MPEG-2 transport stream.

44. The system displaying said video signal and said graphics data as recited in claim 43, wherein said target further comprises:

a video decoder coupled to said mixer and said controller, said video decoder receiving and decoding said MPEG-2 transport stream and outputting a decoded video signal indicative thereof to said mixer.

45. The system displaying said video signal and said graphics data as recited in claim 44, wherein said target further comprises:

a graphics processor coupled to said mixer and said controller, said graphics processor receiving and processing said graphics data, and outputting a processed graphics data indicative thereof to said mixer.

46. The system displaying said video signal and said graphics data as recited in claim 34, wherein said source further comprises:

a storage unit storing said information received from said target.

47. The system displaying said video signal and said graphics data as recited in claim 34, wherein:

said source generates said display control signal based on said information received from said target.

48. The system displaying said video signal and said graphics data as recited in claim 47, wherein said display control signal comprises:

a command instructing said target to utilize said at least one of display capabilities and display features available at said target in a prescribed manner.

49. The system displaying said video signal and said graphics data as recited in claim 48, wherein said command comprises:

a vendor dependent command available from an Audio Visual Control Transaction Set (AV/C CTS).

50. The system displaying said video signal and said graphics data as recited in claim 48, wherein said at least one of display capabilities and display features comprises:

a picture-in-graphics (PIG) feature, said command further comprises information with respect to a starting position and a size of a video portion of said combined display.

51. The system displaying said video signal and said graphics data as recited in claim 48, wherein said at least one of display capabilities and display features comprises:

a double screen feature dividing a screen of said target into a plurality of sub-screens, wherein said command further comprises information indicating in which of said sub-screens a video portion of said combined display is to be displayed.

52. The system displaying said video signal and said graphics data as recited in claim 48, wherein said at least one of display capabilities and display features comprises:

a chroma keying feature, wherein said command further comprises information with respect to a color of said video signal to be replaced by said graphics data.

53. The system displaying said video signal and said graphics data as recited in claim 48, wherein said at least one of display capabilities and display features comprises:

a color keying feature, wherein said command further comprises information with respect to a color of said graphics data to be replaced by said video signal.

54. The system displaying said video signal and said graphics data as recited in claim 34, wherein said at least one of display capabilities and said display features comprises an information block with respect to said display capabilities and display features of said target, said information block comprising:

a <Compound_Length> field,

an <Info_Block_Type> field,

a <Primary_Fields_Length> field, wherein said <Compound_Length> field, <Info_Block_Type> field, and said <Primary_Fields_Length> field identify a type and size of said block,

a <Specifier_Id> field comprising said identity of a supplier of said block,

a <PIG> field indicating one of whether a PIG feature is supported by said target and whether said feature is supported by a PIG standard said target follows,

a <Video min X position>,

a <Video max X position>,

a <Video min Y position>,

a <Video max Y position>, wherein said <Video min X position>, said <Video max X position>, said <Video min Y position>, and said <Video max Y position> specify a range of a definable position of said screen,

a <Video Size> field indicating scale factors supported by said target,

a <Double Screen> field indicating whether a double screen feature or split screen feature is supported by said target,

a <Left or Right Enable> field indicating which side of said double screen said video signal is to be displayed,

a <Chroma Keying> field specifying whether chroma keying feature is supported by said target,

a <Color Keying> field specify whether color keying feature is supported by said target, and

an appropriate syntax by which applicable color is described.

55. The system displaying said video signal and said graphics data as recited in claim 48, wherein said command comprises:

an <AV/C CTS (0,x0)> field,

a <Ctype> field, a <Subunit> field,

a <Subunit_Id> field,

an <Opcode(0x00)> field, wherein said <AV/C CTS (0,x0)> field, said <Ctype> field, said <Subunit> field, said <Subunit_Id> field, and said <Opcode(0x00)> field specify said type of said command,

a <Company_Id> field identifying a vendor that supports said particular command,

Video X position fields identifying most significant bits and least significant bits of a starting X coordinate of said screen,

Video Y position fields identifying a most significant bits and a least significant bits of a starting Y coordinate of said screen, and

a <Video Size> filed specifying a scale factor for said screen.

56. A method of transmitting a video signal and graphics data from a source to a target, comprising:

sending a display control signal from said source to said target, said display control signal prescribing a manner in which said video signal is to be displayed in relation to said

graphics data within a combined display formed by combining said video signal and said graphics data at said target.

57. The method of transmitting the video signal and said graphics data as recited in claim 56, further comprising:

sending, from said target to said source, information comprising at least one of display capabilities and display features of said target, and

generating said display control signal based on said information received from said target.

58. The method of transmitting said video signal and said graphics data as recited in claim 57, further comprising:

sending, from said source to said target, a query to receive said information,

sending said information from said target to said source, and

generating said display control signal based on said information received from said target.

59. The method of transmitting said video signal and said graphics data as recited in claim 57, further comprising:

storing said information in said source.

60. The method of transmitting said video signal and said graphics data as recited in claim 59, further comprising automatically updating said stored information when the at least one of display capabilities and display features of said target device changes.

61. The method of transmitting said video signal and said graphics data as recited in claim 59, further comprising:

receiving a prompt from said target when at least one of the display capabilities and the display features of said target device changes; and

updating said stored information based upon receipt of the prompt from said target.

62. The method of transmitting said video signal and said graphics data as recited in claim 58, further comprising:

detecting whether said information indicates that said target supports at least one of a picture-in-graphics feature, a double screen feature, a chroma keying feature, and a color keying feature.

63. The method of transmitting said video signal and said graphics data as recited in claim 62, further comprising:

determining whether said information indicates that said picture-in-graphics feature is supported by said target; and

obtaining from said information display capabilities of said target comprising screen size, resolution, and allowable locations of a display screen in which said video signal is to be displayed when said picture-in-graphics feature is supported by said target.

64. The method of transmitting said video signal and said graphics data as recited in claim 62, further comprising:

determining whether said information indicates that said double screen feature of dividing said display screen into sub-screens is supported by said target, said information further comprising a field of available sub-screens in which said video signal is to be displayed when said double screen feature is supported by said target.

65. The method of transmitting said video signal and said graphics data as recited in claim 62, further comprising:

determining whether said information indicates that said chroma feature is supported by said target, said information further comprising a field of allowable syntax by which an applicable color is described when said chroma feature is supported by said target.

66. The method of transmitting said video signal and said graphics data as recited in claim 62, further comprising:

determining whether said information indicates that said color keying feature is supported by said target, said information further comprising a field of allowable syntax by which an applicable color is described when said color keying feature is supported by said target.

67. The method of transmitting said video signal and said graphics data as recited in claim 62, wherein said sending of said display control signal comprises:

sending from said source a command instructing said target to utilize said at least one of display capabilities and display features available at said target in said prescribed manner.

68. The method of transmitting said video signal and said graphics data as recited in claim 67, wherein said command comprises:

a vendor dependent command available from an Audio Visual Control Transaction Set (AV/C CTS).

69. The method of transmitting said video signal and said graphics data as recited in claim 67, wherein said command comprises:

a command instructing said target to utilize said picture-in-graphics feature, said command further comprising information with respect to a starting position and a size of a video portion of said combined display.

70. The method of transmitting said video signal and said graphics data as recited in claim 67, wherein said command comprises:

a command instructing said target to utilize said double screen featureto divide a screen of said display unit into a plurality of sub-screens, said command further comprising information indicating in which of said plurality of sub-screens a video portion of said combined display is to be displayed.

71. The method of transmitting said video signal and said graphics data as recited in claim 67, wherein said one or more command comprises:

a command instructing said target to utilize said chroma keying feature, said command further comprising information with respect to a color of said video signal to be replaced by said graphics data.

72. The method of transmitting said video signal and said graphics data as recited in claim 67, wherein said command comprises:

a command instructing said target to utilize said color keying feature, said command further comprising information with respect to a color of said graphics data to be replaced by said video signal.

73. A computer readable storage medium having stored thereon a computer program for implementing a method of transmitting a video signal and graphics data from a source to a target, said computer program comprising a process of:

sending a display control signal from said source to said target, said display control signal prescribing a manner in which said video signal is to be displayed in relation to said graphics data within a combined display formed by combining said video signal and said graphics data at said target.

74. The computer readable storage medium as recited in claim 73, further comprising:

sending, from said target to said source, information comprising at least one of display capabilities and display features of said target, and

generating said display control signal based on said information received from said target.

75. The computer readable storage medium as recited in claim 74, further comprising:

sending, from said source to said target, a query to receive said information,

sending said information from said target to said source, and

generating said display control signal based on said information received from said target.

76. The computer readable storage medium as recited in claim 74, further comprising:

storing said information in said source.

77. The computer readable storage medium as recited in claim 76, further comprising automatically updating said stored information when the at least one of display capabilities and display features of said target device changes.

78. The computer readable storage medium as recited in claim 76, further comprising:

receiving a prompt from said target when at least one of the display capabilities and the display features of said target device changes; and

updating said stored information based upon receipt of the prompt from said target.

79. The computer readable storage medium as recited in claim 74, further comprising:

detecting whether said information indicates that said target supports at least one of a picture-in-graphics feature, a double screen feature, a chroma keying feature, and a color keying feature.

80. The computer readable storage medium as recited in claim 79, further comprising:

determining whether said information indicates that said picture-in-graphics feature is supported by said target; and

obtaining from said information display capabilities of said target comprising screen size, resolution, and allowable locations of a display screen in which said video signal is to be displayed when said picture-in-graphics feature is supported by said target.

81. The computer readable storage medium as recited in claim 79, further comprising:

determining whether said information indicates that said double screen feature of dividing said display screen into sub-screens is supported by said target, said information further comprising a field of available sub-screens in which said video signal is to be displayed when said double screen feature is supported by said target.

82. The computer readable storage medium as recited in claim 79, further comprising:

determining whether said information indicates that said chroma feature is supported by said target, said information further comprising a field of allowable syntax by which an applicable color is described when said chroma feature is supported by said target.

83. The computer readable storage medium as recited in claim 79, further comprising:

determining whether said information indicates that said color keying feature is supported by said target, said information further comprising a field of allowable syntax by which an applicable color is described when said color keying feature is supported by said target.

84. The computer readable storage medium as recited in claim 79, wherein said generating said display control signal further comprises:

sending from said source a command instructing said target to utilize said at least one of display capabilities and display features available at said target in said prescribed manner.

85. The computer readable storage medium as recited in claim 84, wherein said generating said command further comprises:

a vendor dependent command available from an Audio Visual Control Transaction Set (AV/C CTS).

86. The computer readable storage medium as recited in claim 84, wherein said command comprises:

a command instructing said target to utilize said picture-in-graphics feature, said command further comprising information with respect to a starting position and a size of a video portion of said combined display.

87. The computer readable storage medium as recited in claim 84, wherein said command comprises:

a command instructing said target to utilize said double screen featureto divide a screen of said display unit into a plurality of sub-screens, said command further comprising information indicating in which of said plurality of sub-screens a video portion of said combined display is to be displayed.

88. The computer readable storage medium as recited in claim 84, wherein said command comprises:

a command instructing said target to utilize said chroma keying feature, said command further comprising information with respect to a color of said video signal to be replaced by said graphics data.

89. The computer readable storage medium as recited in claim 84, wherein said command comprises:

a command instructing said target to utilize said color keying feature, said command further comprising information with respect to a color of said graphics data to be replaced by said video signal.